# VEGETATION STUDIES

~~JULY 2001~~

## Lake Nabnasset Nuisance Aquatic Vegetation Management Program

water runoff and erosion, provide mechanisms for nutrient delivery to the lake, which may stimulate or foster the increased production of submerged aquatic vegetation and/or algal blooms.

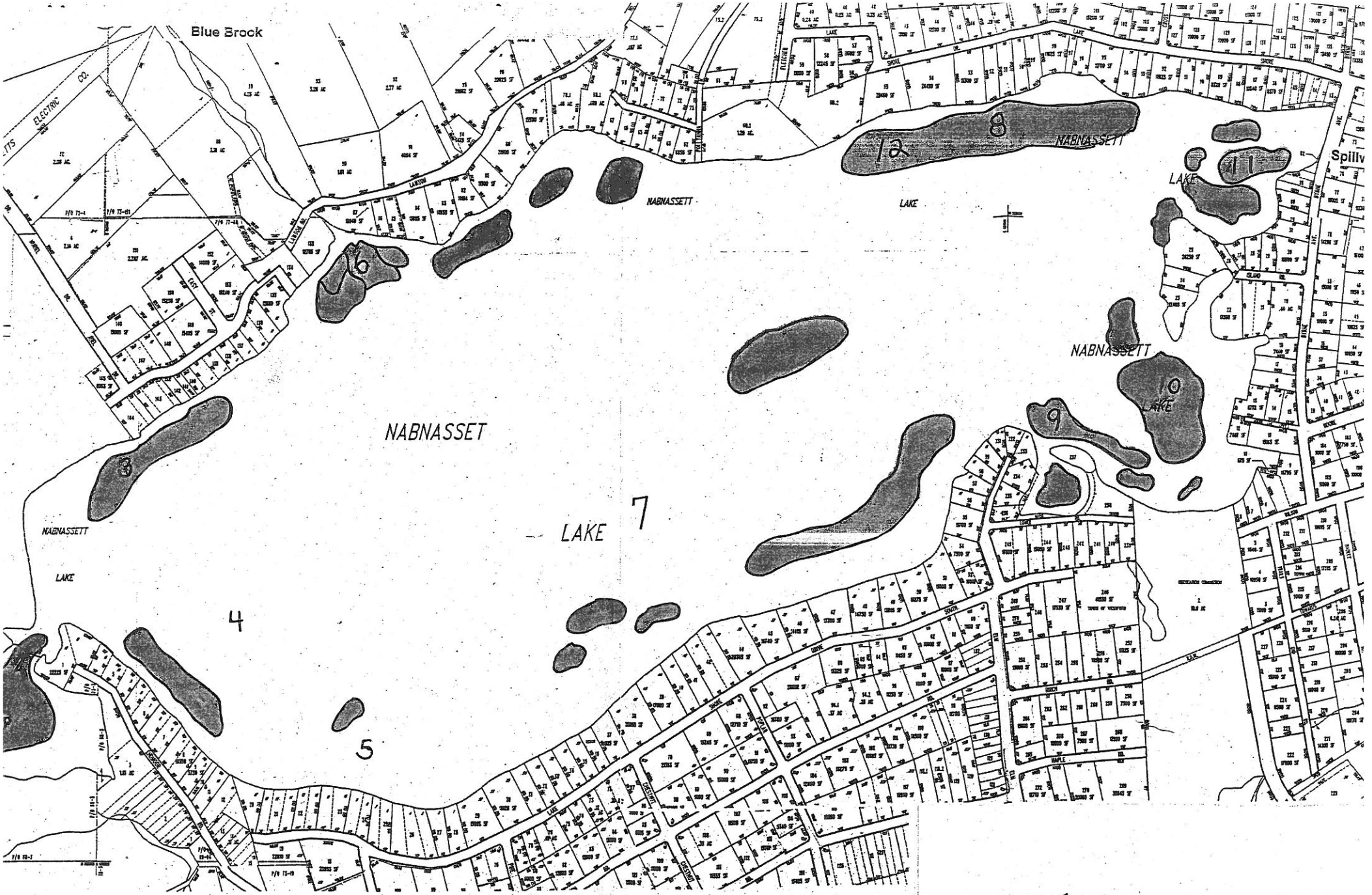
While the species identified throughout Nabnasset Lake were aggressive native species, the abundance of plants throughout the greater extent of the shoreline evidence the high nutrient inputs to the lake from both natural sources, i.e. Shipley Swamp and Blue Brook, and anthropogenic sources, i.e. leaching fields and lawn fertilizer. The Nabanasset Lake Preservation Association (NLPA) has made an effort to promote awareness of the issues of eutrophication of Nabanasset Lake. However, to further the individual efforts of residents, a management strategy designed to decrease potential nutrient loading sources, and decrease the abundance of submerged aquatic vegetative growth within the lake is necessitated. The potential problems related to abundant macrophytic growth, or submerged aquatic vegetative growth, relate to a perturbation in the natural food web of the ecosystem, specifically related to a decrease in ambient oxygen levels with breakdown of the plant material through microbial activity. These perturbations in ambient oxygen levels would not be evident during the growing season as the plants are producing oxygen through photosynthesis. However, at the close of the growing season as the abundant plant material is decomposed through microbial activity, ambient oxygen will be utilized at the expense of the naturally respiring fauna.

Table 4: Vegetative Species within Sampling Locations on Nabnasset Lake

| Station # | Species | Common Name | Provenance |
|---|---|---|---|
| 1 | *Potamogeton illinoensis*<br>*Najas flexilis*<br>*Utricularia purpurea* | Illinois pondweed<br>bushy pondweed<br>purple bladderwort | native<br>native<br>native |
| 2 | *Myriophyllum sp.* | water milfoil | possible invasive |
| 6 | *Vallisneria americana*<br>*Elodea canadensis* | wild celery<br>waterweed | native<br>native |
| 8 | *Gratiola lutea f. pusilla*<br>*Sagittaria teres, Eriocaulon sp.*, or possibly *Isoetes sp.* | hedge hyssop<br>dwarf wapato, pipewort or quillwort ? | native<br>likely native |
| 8-Sand Bar | *Elodea canadensis*<br>*Potamogeton amplifolius*<br>*Chara* or *Nitella sp.* | waterweed<br>large leaf pondweed<br>muskweed | native<br>native<br>native |
| 9 | *Vallisneria americana*<br>*Potamogeton illinoensis*<br>*Ceratophyllum demersum*<br>*Najas flexilis* | wild celery<br>Illinois pondweed<br>coontail<br>bushy pondweed | native<br>native<br>native<br>native |
| 10 | *Ceratophyllum demersum* | coontail | native |
| 11-Cove | *Vallisneria americana* | wild celery | native |
| 12 | *Elodea canadensis*<br>*Potamogeton robbinsii* | waterweed<br>fern pondweed | native<br>native |

## 5. Management Strategies

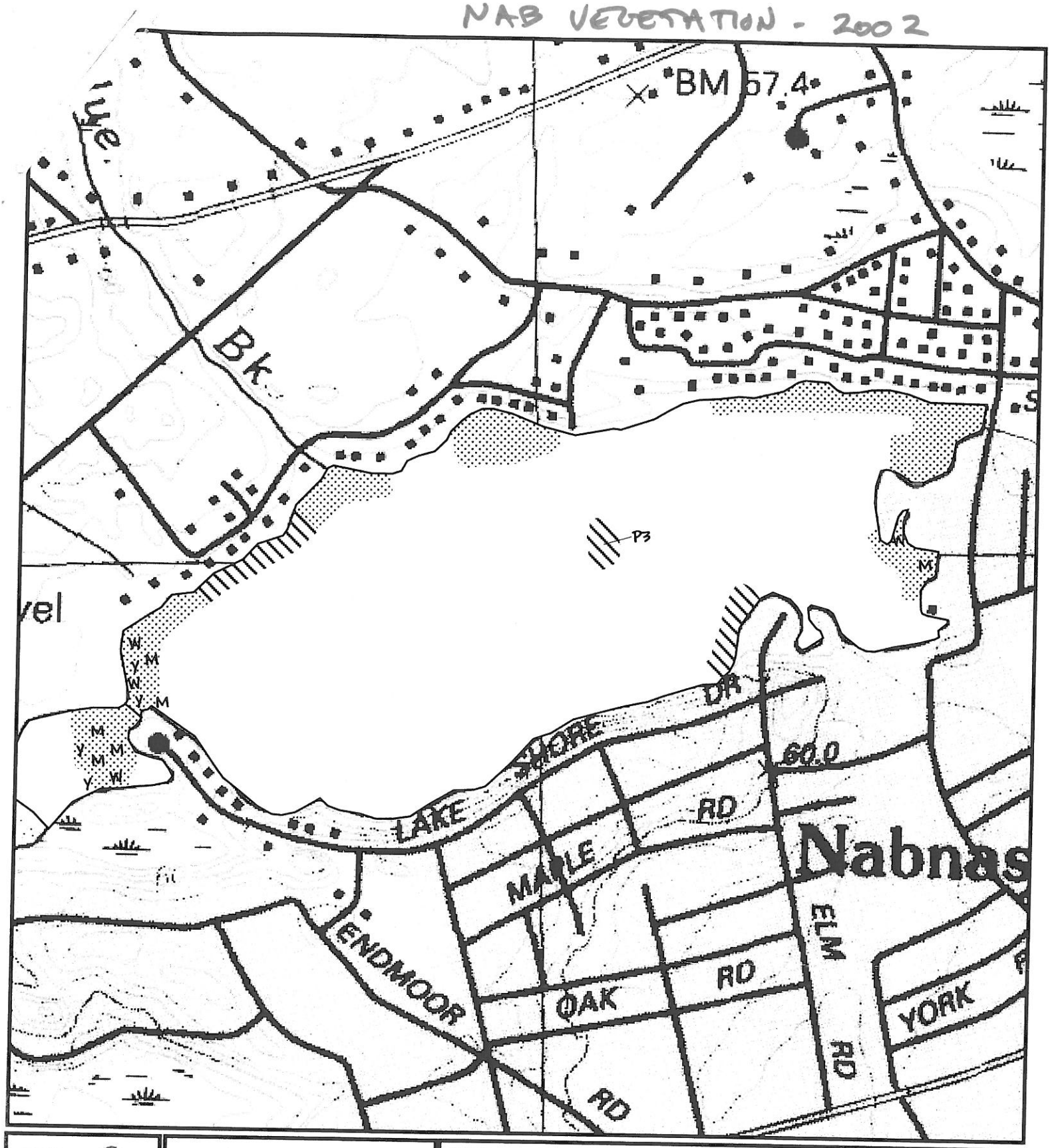
A variety of techniques are available to manage submerged aquatic vegetation within lake and pond ecosystems. These include a variety of mechanical methods such as cutting, harvesting and rotovating or water level manipulation, chemical applications such as herbicides, biocontrols such as release of insects, fish or plant pathogens as biological control agents, or localized treatments such as covering sediments with

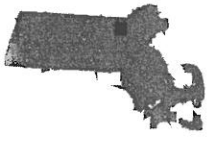


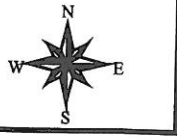

# Nabnasset Lake

## Westford, MA

NAB VEGETATION - 2002






Nabnasset Lake

**Westford, MA**

**Vegetation**

| FIGURE | SURVEY DATE | MAP DATE |
|---|---|---|
| 6 | 11/14/02 | 12/31/02 |

LEGEND

Higher Density - Vallinseria and largeleaf pondweed co-dominant with lesser amounts of elodea, Robbins pondweed and muskgrass/ stonewort

Lower Density - Vallinseria and largeleaf pondweed co-dominant with lesser amounts of elodea, Robbins pondweed and muskgrass/ stonewort

P3 - Low density of invasive curlyleaf pondweed and possible treatment area

M - Scattered watermilfoil thought to be the invasive variable milfoil species

W - White Waterlily

Y - Yellow Waterlily

SCALE 400 0 400 800 Feet


AQUATIC CONTROL TECHNOLOGY, INC.
POND AND LAKE MANAGEMENT SPECIALISTS

11 John Road
Sutton, Massachusetts 01590
PHONE: (508) 865-10000
FAX : (508) 865-1220
EMAIL: info @aquaticcontroltech.com
WEB: www.aquaticcontroltech.com

SHIPLEY VEGETATION
2002 + 2004

**Table 2. Plant plot survey data from April, 2002 and August, 2004 showing percent* plant cover in each 4 $m^2$ plot**

| Common name | Scientific name | 2002 | | | 2004 | | |
|---|---|---|---|---|---|---|---|
| | | Plot 1 | Plot 2 | Plot 3 | Plot A | Plot B | Plot C |
| Wild Rice | *Zizania aquatica* | | | | 80% | | 90% |
| Marsh St. Johns Wort | *Hypericum virginicum* | | | | trace | 10% | |
| Mint | *Menthis sp.* | | | | | 3% | |
| Golden Hedge Hyssop | *Gratiola aurea* | | | | | 3% | |
| Spike-rush | *Eleocharis* sp. | | | | 3% | 35% | |
| Nodding waternymph | *Najas flexilis* | | | | 3% | | |
| Arrow Arum | *Peltandra virginica* | | | | trace | 3% | trace |
| Broad leaved cattail | *Typha latifolia* | | 20% | | 3% | | |
| Purple loosestrife | *Lythrum salicaria* | 40% | | | 10% | | 3% |
| White waterlily | *Nymphaea odorata* | | | | 10% | 40% | |
| Pickerelweed | *Pontedaria cordata* | | | | | | 3% |
| Ribbonleaf Pondweed | *Potamogeton epihydrus* | | | | | 10% | |
| Woolgrass | *Scirpus cyperinus* | | | | 3% | | |
| Bladderwort | *Utricularia vulgaris* | | | | | 3% | |
| Filamentous green algae | Chlorophyta | | | | | trace | |
| Water calla | *Calla palustris* | | | 3% | | | |
| Leatherleaf | *Chamaedaphne calyculata* | | | 10% | | | |
| Bog laurel | *Kalmia polifolia* | | | 1% | | | |
| Spatterdock | *Nuphar variegatum* | | 3% | | | | |
| Sedge | *Carex* sp. | | | 50% | | | |
| Bur-reed | *Sparganium americana* | 5% | 3% | | | | |
| Sphagnum moss | *Sphagnum* sp. | | | 10% | | | |
| Highbush blueberry | *Vaccinium corymbosum* | | | 10% | | | 3% |

* Percentage values represent percent cover of each species within the sampled 4 $m^2$ vegetation monitoring plot.

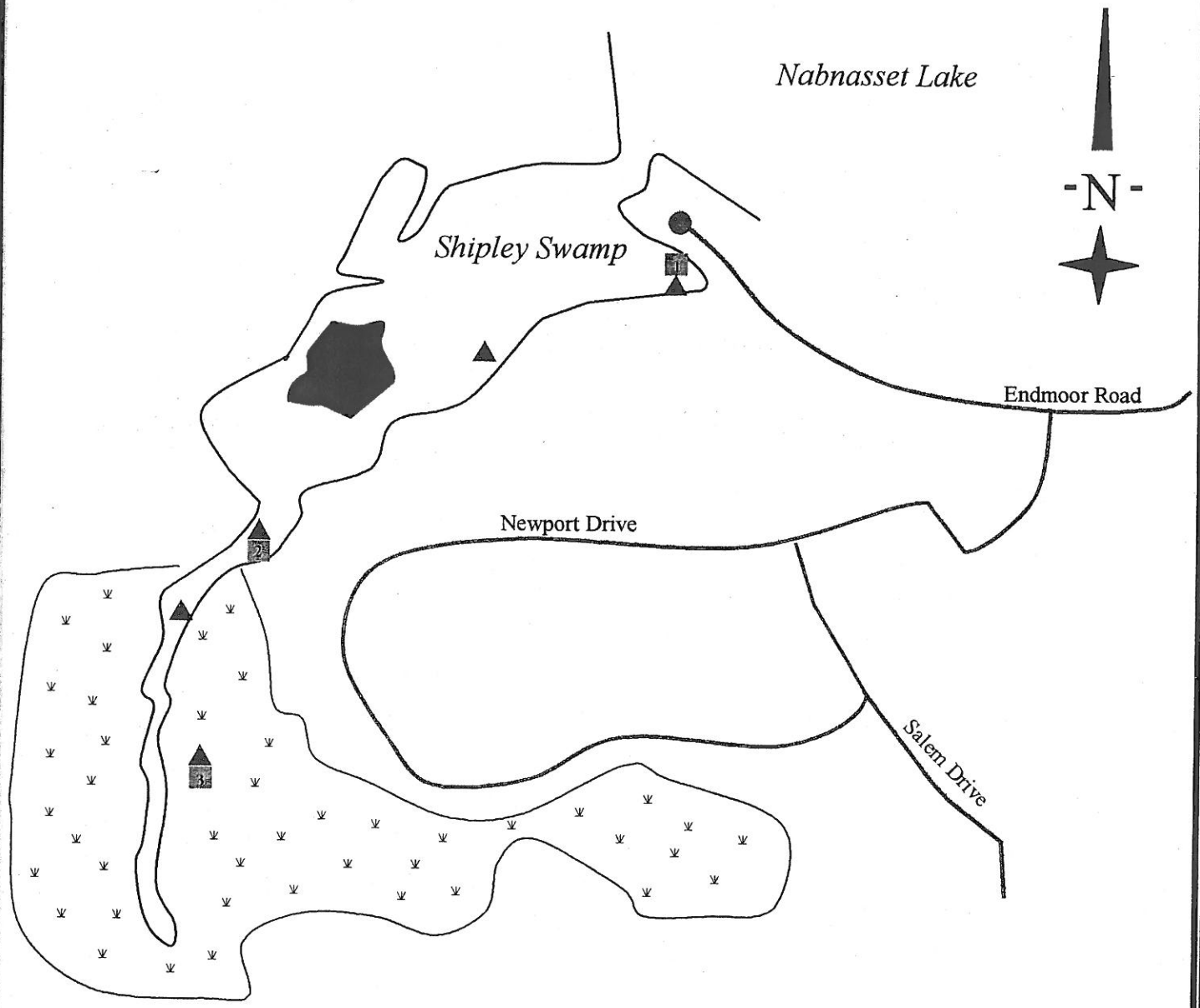
SHIPLEY VEGETATION 2002

**Table 2. Plant plot survey data from May 15, 2002 showing percent* plant cover in each 4 $m^2$ plot and relative dominance in Shipley Swamp.**

| Common name | Scientific name | Plot 1 | Plot 2 | Plot 3 | Relative Dominance** |
|---|---|---|---|---|---|
| Red maple | *Acer rubrum* | | | | 3 |
| Speckled alder | *Alnus rugosa* | | | | 3 |
| Gray birch | *Betula populifolia* | | | | 5 |
| Water calla | *Calla palustris* | | | 3% | 4 |
| Sedge | *Carex* sp. | | | 50% | 3 |
| Tussock sedge | *Carex stricta* | | | | 2 |
| Leatherleaf | *Chamaedaphne calyculata* | | | 10% | 1 |
| Muskgrass | *Chara* or *Nitella* sp. | | | | 5 |
| Spike-rush | *Eleocharis* sp. | | | | 3 |
| Sheep laurel | *Kalmia latifolia* | | | | 4 |
| Bog laurel | *Kalmia polifolia* | | | 1% | 4 |
| Duckweed | *Lemna minor* | | | | 3 |
| Purple loosestrife | *Lythrum salicaria* | 40% | | | 2 |
| Mosses | Musci spp. | | | | 4 |
| Sweet gale | *Myrica gale* | | | | 2 |
| Spatterdock | *Nuphar variegatum* | | 3% | | 2 |
| White waterlily | *Nymphaea odorata* | | | | 2 |
| Pickerelweed | *Pontedaria cordata* | | | | 5 |
| Big-leaf pondweed | *Potamogeton amplifolius* | | | | 5 |
| Ribbonleaf Pondweed | *Potamogeton epihydrus* | | | | 3 |
| Curly pondweed | *Potomogeton crispus* | | | | 5 |
| Rhodora | *Rhododendron canadense* | | | | 3 |
| Broad-leaved arrowhead | *Sagittaria latifolia* | | | | 5 |
| Woolgrass | *Scirpus cyperinus* | | | | 2 |
| Bur-reed | *Sparganium americana* | 5% | 3% | | 1 |
| Sphagnum moss | *Sphagnum* sp. | | | 10% | 2 |
| Steeplebush | *Spiraea alba* | | | | 4 |
| Broad-leaved meadowsweet | *Spiraea latifolia* | | | | 5 |
| Broad-leaved cattail | *Typha latifolia* | | 20% | | 1 |
| Highbush blueberry | *Vaccinium corymbosum* | | | 10% | 2 |

* Percentage values represent percent cover of each species within the sampled 4$m^2$ vegetation monitoring plot.

** Relative dominance values used are based upon a scale for assessing overall species abundance throughout Shipley Swamp, ordered from most to least dominant: 1- dominant, 2- abundant, 3- common, 4- infrequent or occasional, 5- rare or scarce.




Legend

- 4m² Vegetation Monitoring Plots
- Macroinvertebrate Sampling Locations
- Wetland Areas
- Island

1" = 1,000 Ft

**Approximate Scale**

**Vegetation Monitoring Plots and Macroinvertebrate Sampling Locations**

**Shipley Swamp, Westford MA**

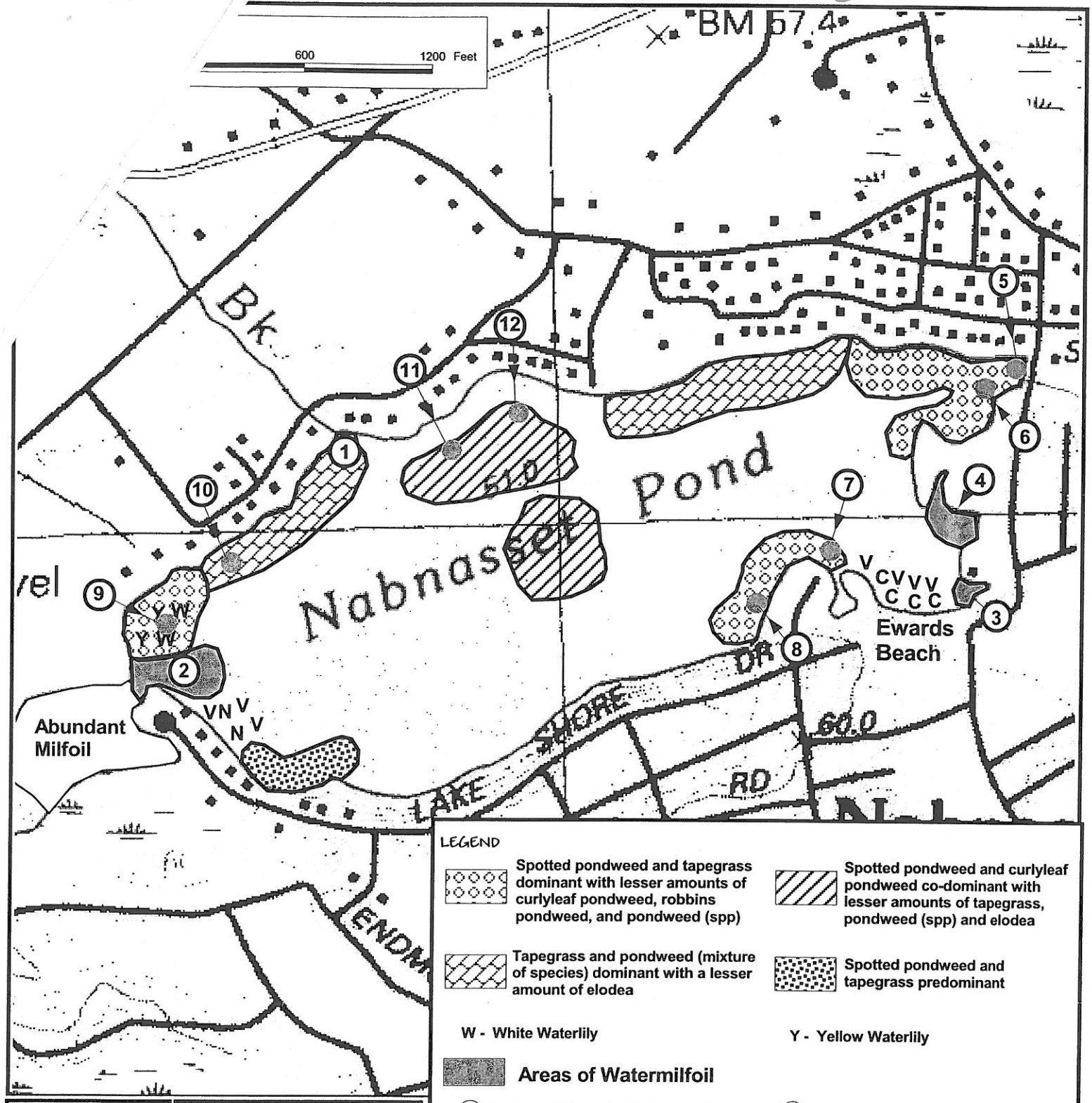
**FIGURE NO.**
**5**

PROJECT NO.
W196-000

ESS

J:\Nabnasset\Swamp bathymetry

NAB VEGETATION- 2003




LEGEND

- Spotted pondweed and tapegrass dominant with lesser amounts of curlyleaf pondweed, robbins pondweed, and pondweed (spp)
- Spotted pondweed and curlyleaf pondweed co-dominant with lesser amounts of tapegrass, pondweed (spp) and elodea
- Tapegrass and pondweed (mixture of species) dominant with a lesser amount of elodea
- Spotted pondweed and tapegrass predominant

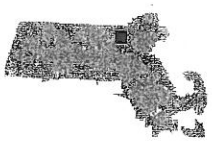
W - White Waterlily

Y - Yellow Waterlily

**Areas of Watermilfoil**

1. Scattered Plants ( ~ 5 observed)
2. Est. 15,000 sq. ft. with 25-33% milfoil cover
3. Est. 7,500 sq. ft. with 25-33% milfoil cover
4. Est. 15,000 sq. ft. with 25-50% milfoil cover
5. Scattered Plants (5-10 observed)
6. Scattered (1 plant observed)
7. Scattered (several plants observed)
8. Scattered (several plants observed ~ 100 ft. off-shore from yellow house)
9. Scattered (several plants observed)
10. Scattered (1 plant observed)
11. Scattered (several plants observed ~ 100 ft. off-shore from "Loiselle" house)
12. Scattered (several plants observed ~ 100 ft. off-shore from "Martin" house)

*Note: Coontail (C), tapegrass (V) and stonewort (N), patchy or scattered*



N
W E
S

# Nabnasset Pond

**Westford, MA**

**Vegetation Map**

**Survey Date:**
**June 28, 2003 and July 2, 2003**